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**DATE:** 4 February 2008

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## REVIEW OF SEMI-ANNUAL MONITORING REPORT – GOOSE LAKE COALITION

The Central Valley Regional Water Quality Control Board (Regional Water Board) received the December 2007 Semi-Annual Monitoring Report (SAMR) from the Goose Lake Coalition (Coalition) on 20 December 2007. The SAMR covers the monitoring period from 1 May 2007 through 31 October 2007. This report was submitted to meet the conditions of Resolution R5-2005-0833 and the associated *Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands* adopted by the Regional Board on 1 July 2006 (Resolution R5-2006-0053).

Regional Board staff has reviewed the SAMR to determine if the required reporting elements detailed in Resolution R5-2006-0053, as well as the technical and reporting requirements set forth in both the Monitoring and Reporting Program No. R5-2005-0833 (MRP) and the Coalition's Monitoring and Reporting Program Plan (MRP Plan), are completely and adequately addressed. Staff also evaluated the quality of the data generated and the conclusions and recommendations presented in the SAMR. This review discusses eight items related to administrative and analytical aspects of the SAMR.

## ADMINISTRATIVE ASPECTS

The SAMR has been evaluated for the presence and completeness of several key components, as described in the MRP, including: a description of the watershed, monitoring objectives, sampling site descriptions, a location map including sampling sites, tabulated results from sample analyses, sampling and analytical methods, chain-of-custody forms, quality control sample results (including a summary of precision and accuracy), pesticide use information, data interpretation, actions taken to address identified water quality impacts from agricultural discharges, exceedance reports, conclusions and recommendations.

In general, the required components of the Coalition's SAMR were completely and satisfactorily addressed by the Coalition. However, laboratory reporting related to two toxicity analysis results is incomplete. This item is discussed in detail under the Analytical Aspects section of this memo. Additional items listed below contain recommendations, as well as requests for clarification or additional information, that will improve the SAMR.

***California Environmental Protection Agency***

**Item 1:** The toxicity laboratory did not provide *cover sheets with a signature* in their toxicity data reports. For future monitoring reports, the Coalition should request a laboratory report from the toxicity laboratory that includes a cover sheet with the signature of the QA Officer or Project Manager. The Coalition will need to include *signed* toxicity laboratory reports in future monitoring reports.

**Item 2:** Under Section 9 (Discussion of Quality Control Results), the SAMR includes a summary of measurement quality objectives for General Water Chemistry Analyses. Precision and recovery results are discussed, but accuracy is not included. The Coalition should add a discussion for accuracy, which is assessed using the results from the laboratory control spike (LCS).

**Item 3:** Under Section 9 (Discussion of Quality Control Results), the SAMR includes a summary of measurement quality objectives for Follow-up Metals Analyses. Precision and recovery results are discussed, but accuracy is not included. The Coalition should add a discussion for accuracy, which is assessed using the results from the laboratory control spike (LCS). Additionally, the results from the laboratory duplicate should be added to the precision discussion.

**Item 4:** A summary table that provides an overview of measurements taken, analyses performed, and monitoring results would be a valuable tool for the reader. The Coalition should add a summary table to the SAMR, possibly near the beginning of Section 10, Data Interpretation and Discussion of Results. The table should include the parameters tested, the applicable water quality objectives, and the exceedances observed.

**Item 5:** Appendix A of the SAMR presents all results in a tabulated form, as required under the MRP. I suggest that the Coalition bold the rows for results that were an exceedance. This would make it easier to identify those values.

**Item 6:** Under Section 10, Data Interpretation and Discussion of Results, a discussion of test results is presented for the 5/24/07 follow-up sampling event. Paragraph 3 indicates that the Coalition also gathered information from the County road department, the U.S. Forest Service, and other entities in an effort to determine whether other land use activities are causing toxicity. The Coalition should discuss the outcome of this effort in an addendum to the SAMR.

## **ANALYTICAL ASPECTS**

Staff reviewed all laboratory report results, including quality control results, for accuracy and completeness. The SAMR presentation, discussion and interpretation of these results were also evaluated for completeness and accuracy.

**Item 7:** In Section 10, Data Interpretation and Discussion of Results, the SAMR discusses the results of the *Ceriodaphnia dubia* toxicity test from the LC1 6/20/07 sampling event. For this toxicity test result, the lab control samples had 100% survival, while the treatment samples had a mean of 40% survival. Based on the USEPA-approved statistical test procedures, the results of a Wilcoxon Rank Sum Two-Sample test did not show a statistically significant

reduction in *Ceriodaphnia* survival in comparison to the control. This is a valid statistical interpretation of the data, but it does not account for the anomaly exhibited in the treatment data.

Out of five organisms per replicate, the proportion of *Ceriodaphnia* that survived in the four replicate treatment samples was 1, 1, 1, and 5. The survival of 5 organisms in one replicate appears to be an outlier. According to *USEPA Methods for Measuring the Acute Toxicity for Effluents and Receiving Waters to Freshwater and Marine Organisms* (October 2002), "The choice of a statistical method to analyze toxicity test data and the interpretation of the results of the analysis of the data can become problematic if there are anomalies in the data." Furthermore, the USEPA manual states: "An explanation should be sought for any questionable data points. Without an explanation, data points should be discarded only with extreme caution. If there is no explanation, the statistical analysis should be performed both with and without the outlier, and the results of both analyses should be reported."

The Coalition should request an addendum from PER that discusses the toxicity test results and the implication of the anomaly displayed in the data. PER should perform the statistical analysis with and without the outlier, and report both results. The Coalition can then attach this discussion to a brief addendum to their SAMR.

**Item 8:** In Section 10, Data Interpretation and Discussion of Results, the SAMR discusses the results of a *Ceriodaphnia dubia* TIE performed on the LC1 6/20/07 sample. This TIE result is also discussed in Section 9 (Discussion of Quality Control Results), under Toxicity Analyses. Based on a review of the laboratory data and CETIS test results provided in PER's Toxicity Evaluation Report, it appears that the laboratory's interpretation of these test results and the Coalition's discussion are not correct.

Based on the test acceptability criteria established by the USEPA and included in PER's Standard Operating Procedures manual, a toxicity test is not considered valid if the mean survival in control treatments is not at least 90%. The mean survival of the LC1 TIE control samples was 30% and there was no survival in the non-manipulated baseline creek sample. It is not known whether laboratory error or the creek sample itself caused the mortality. Therefore, the test results should not be considered valid. The Coalition should request an amended report from PER for this TIE result.

An additional error was identified in the CETIS results of this TIE, although in this particular case it did not affect the outcome of the test. In the Data Summary portion of the first CETIS Analysis Detail, the 100% baseline sample data was incorrectly calculated. The results of all five-baseline test results were averaged and then compared to the lab water data. Only the 100% baseline results should have been compared to the lab water data.

Attachment: Annual Monitoring Report Review Checklist